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## **Nature and limits to growth**

### **The role of business in designing new path for development**

Some ten thousand years ago, at the time when Mother Earth was gradually adjusting to the end of the last Ice Age, it is estimated that about 10 million people lived on this planet. The agricultural revolution, as well as new technology, enabled man to expand into new territory, and by 1750 this planet was the home to some 800 million people. With the industrial revolution, man was able to expand his territory still further and by the year 2000 Earth was sustaining the life of some 6,000,000,000 people. This number could grow to 9,000,000,000 by the middle of this century, according to UN estimates. Unfortunately, though the two revolutions formed the basis for exponential growth in the human population, they did not create a society with sustainable use of resources and equitable distribution of the fruits of nature. Consequently, the state of the environment is poor, one-fifth of the world population is responsible for close to 90 per cent of total personal consumption and 1.2 billion live in extreme poverty on less than US\$1 per day.<sup>1</sup>

Some 30 years ago the stage was set for the current debate about how nature and population can constrain growth and welfare. I refer to the Club of Rome and the publication of the book “Limits to Growth,” which warned that uncontrolled use of natural resources and continuous population growth were not sustainable and would have a disastrous effect on human society as well as on the earth.<sup>2</sup>

We are continuously receiving information which supports the view that humanity is borrowing resources from future generations. Global statistics indicate that many important natural resources are being depleted or degraded and that emissions and waste from human economic activities have strained the capacity of nature over the sustainable limit.

UNEP’s third report on the Global Environmental Outlook states: “there has been immense change in both human and environmental conditions over the past 30 years. In an unprecedented period of population increase, the environment has been heavily drawn upon to meet a multiplicity of human needs.”

In a new report by the Global Footprint Network, it is stated that humanity is consuming over 20 percent more natural resources than the Earth can produce. In this report it is stated that the Earth has about 11.4 billion hectares of productive land and

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<sup>1</sup> UNEP 2003.

<sup>2</sup> Limits to Growth, the 30-year update (2004), has been a useful source of information for this paper.

sea space. This is equivalent to 1.9 hectares for each of the six billion people living on Earth. Unfortunately, according to the same estimate, the consumption of the average consumer was 2.3 hectares.<sup>3</sup>

### **Natural resources**

I would like to describe the current state of three important natural resources. The list could be much longer, but my choice is based on the fact that these three are linked to some of the most important environmental challenges facing Iceland.

### **Soil**

We tend to overlook the fact that soil is Earth's most important resource for food production. In my country, Iceland, we are frequently reminded of this due to the fact that the country has been practically devastated by soil erosion over the last ten centuries. Fortunately, we seem to be reversing that trend. Globally, soils are declining and deteriorating at an escalating rate. Soil is a renewable resource. Estimates by the World Resource Institute in 1998 indicate that topsoil is being lost 16 to 300 times faster than it can be replaced. Once-productive land is being lost, not only through erosion, but also due to salt build-up, the expansion of urban areas and desertification. Thus far, this loss has not had an impact on grain production due to increased production per hectare. The question is not whether but rather for how long yield increases can compensate for the loss of cultivable soil and a growing population. Considerable effort and money is being invested in research devoted to chemical supplements and genetic modification with the aim of increasing yields. There is reason to fear that more extensive use of chemicals and genetically modified crops will not make food production more sustainable but rather intensify the unsustainable exploitation of the soil. A more sustainable answer to the problem of deteriorating topsoil is greater emphasis on organic farming methods, which find a balance between yield and maintaining the productivity of the soil.<sup>4</sup>

### **Fisheries**

On a global basis, fisheries provide only a small fraction of the food humans consume. However, for thousands of coastal communities all over the world and for some islands such as Iceland, fish are the single most important resource. The picture we receive of the state of the world's fisheries is mixed. Statistics indicate that the total world commercial catch has reached a maximum at about 80 million metric tons per year. In 2002 the FAO estimated that about 75 percent of the world's ocean fisheries were fished at or beyond capacity. In many of the world's fishing zones, fish catches have exceeded the estimated sustainable yield. Some countries, including my

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<sup>3</sup> See: [www.footprintwork.org](http://www.footprintwork.org).

<sup>4</sup> In this context I would like to recall a Japanese tale in "The little Earth Book" [James Bruges, 2000]: Masanobu Fukuoka inherits a farm from his father. He claims to be lazy. If things grow in the wild on their own, why does one have to do so much hard work? he asks. So in a short time he has destroyed his father's orange orchard and is having similar success with the rice. But he persists with his unusual conviction and over the years develops a system of "do nothing" farming. He does not flood his rice fields; he does not weed them; he does not dig or plough and above all he does not use any chemicals. Yet his crops are resistant to pests, yield as much as traditional or chemical rice growing, and require much less work. But the system requires careful management of crops and is related to a particular location; the farmer needs to know the microclimate and to be observant. In the autumn he sows rice, clover and winter barley and covers them with straw. The barley grows immediately and is harvested in May and its straw scattered on the fields. The spring monsoons weaken the weeds and allow the rice to grow through the ground cover. Nothing more is done until the rice is harvested in October.

own, Iceland, appear to have been able to manage this resource to the extent that one could describe their fishing effort as sustainable<sup>5</sup>. In order to achieve this it has been deemed necessary to limit fishing activities with a quota system. The fishing quotas are transferable and are sold and bought at a market price. For years the allocation of fishing rights has been the most debated political question in Iceland. The current system has brought about a change in coastal fishing communities due to the concentration of fishing rights in the hands of ever-larger fishing firms at the cost of smaller family-based one-vessel companies.

Ocean fishing will most likely not increase to support growing populations. Furthermore, we can foresee the collapse of more fish stock in the future as efforts to regulate fishing effort are in many areas not being implemented effectively. This would make it harder to meet increasing demand for food.

The perception that fish farming can make up for the decline in ocean fisheries as a source of food is not entirely accurate. As long as fish farming is based on grain or meal prepared from fish this process does not add to the food supply. Furthermore, in some areas fish farming is destroying coastal fisheries and in a way replacing more sustainable uses of living marine resources.

## **Energy**

The annual human energy use grew by an average of 3.5 percent per year from 1950 to 2000. According to IEA Energy Outlook it can be expected to grow by 1.7 per cent annually over the next 30 years, which implies a two-thirds increase in primary energy consumption. Despite this growth, more than a quarter of the world's population has no access to electricity.

More than 80 percent of the world's commercial energy use comes from fossil fuels. I am not claiming that we will run out of oil and gas in the near future. However, in the long term there is no future for the current world energy supply system, both due to the limited availability of these resources and to the fact that the burning of fossil fuels is the main cause of one of the most challenging environmental problems, namely the increase in Earth's temperature. Gas is much more abundant than oil and it is also better for the climate. Gas can be viewed as a transitional fuel, which may be used as we convert to more sustainable energy sources such as sun, wind, geothermal and hydropower.

In Iceland energy sources are abundant thanks to high mountains, precipitation, glaciers and geothermal heat. Only about 10-20% of Iceland's energy potential is exploited today. The government is eager to utilise more and is advocating that further development of the country's energy potential can constitute Iceland's contribution to a more sustainable energy supply in the world<sup>6</sup>. Today about 80% of the total electricity produced is used to supply energy-intensive aluminium production that has been located in Iceland. Unfortunately, though these energy resources can be labelled as renewable, harnessing them often implies destruction of Iceland's pristine nature and landscape. This issue has caused a deep and difficult conflict in Iceland.

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<sup>5</sup> By this I mean sustainable with respect to fishing activity and stock management. However, when one considers other factors, such as the use of fishing gear, coolants and energy efficiency, "sustainable" is probably not an accurate description.

<sup>6</sup> Note that on regional and global scale, Iceland's energy potential is minimal.

Conservationists claim that pristine Icelandic nature is an even more important contribution to sustainable development than is renewable energy.

### **The optimist**

The people who inhabit this planet depend upon air, water, food, materials and fossil fuels from earth. Here we have briefly discussed three specific resources (soil, fish and energy) in order to underline the importance of all resources for human welfare. We could proceed to discuss other resources, such as forests, minerals and water, and the picture would be the same: the earth's resources are limited and their current use is to a large extent not sustainable. Humans and businesses conducted by human beings usually do not exceed the limit intentionally: overshooting is usually due to a mistake. Or it may be greed that is the reason for overexploitation. Regardless of the reason, unsustainable development can be a very costly mistake if it is not corrected in time. In this paper it has been argued that we have been using more of the planet's resources than the earth is regenerating and we are running out of time to correct this.

Some scholars have voiced the opinion that environmental problems have and will continue to sort themselves out over time without direct interference in the form of specific policies. One of these is Björn Lomborg, the frequently cited Danish statistician<sup>7</sup>. Lomborg's ideas have been given much attention in the media and they do have some support. It is hard not to agree with Lomborg that the environment has improved in a number of ways over the years. However, this has not happened by itself. This improvement is due to the fact that societies have responded responsibly to threats. The problems that we face today will not sort themselves out. I believe we are facing major environmental challenges; we are over the limit of sustainable resource use. The potential consequences of this development are profoundly dangerous, possibly catastrophic. However, if we recognise the problem and take action we can avoid a crash. The keys to the solution are consumers and producers: awareness, the right price signals and responsible behaviour which will reduce resource use and the human impact on the environment.

### **Impact reduction**

Environmental impact can be described as the product of population, multiplied by affluence, multiplied by the damage done by particular technology. In order to avoid a crash landing we need to address all three factors.

Environmental Impact = Population x Affluence x Technology

Here we will not dwell on factors that could change population growth<sup>8</sup>, but we will take a brief look at affluence and technology.

Affluence is determined by consumption. Consumption is determined by the use of materials and energy. At the other end of the equation are emissions and waste. The key to reducing consumers' negative impact on the environment is change in behaviour. Behaviour can be influenced through education and empowerment as well

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<sup>7</sup> Lomborg, *The Sceptical Environmentalist*, 2002.

<sup>8</sup> Interestingly enough, Iceland is one of few European countries where birth rates indicate long-run population growth. Many developing countries are faced with high birth rates, whereas birth rates in developed countries tend to be low, sometimes so low that this can hinder economic development in the long run.

as by sending the right price signals through the market. The results of an educational programme for households which my organisation has conducted in Iceland and which is being conducted in a number of countries, illustrate this. The programme, called Global Plan of Action for the Earth, is aimed at implementing a number of small changes in behaviour. Through these small changes in behaviour, the participating families in Iceland, which now number 500, had on average reduced unsorted waste by 34%, gasoline consumption by 9%, use of electricity by 15% and use of heating water by 21% and had increased the use of eco-labelled goods from 8 to 12% of all goods consumed. This environmental success did not mean sacrificing welfare and well-being. Note that the exercise improved family budgets as well.

Educating the consumer is not enough. To make a lasting impact, the prices that consumers pay for goods need to reflect the full cost of those goods, including the cost for the environment. Goods entail environmental costs, during production, through use and at the end of their life-cycle when they are labelled as waste. The consumer should pay for all of this, not only for the direct cost of production.

George Soros<sup>9</sup> made the point very clearly: “Markets are good at creating wealth but are not designed to take care of other social needs such as protecting the environment.” Technological progress is something businesses are expected to take care of. But increased technological progress, energy intensity and material use will not automatically bring about more sustainable development. It is comforting to hear about businesses that take environmental considerations into account even though there are no financial incentives or regulation directing their actions. However, we cannot depend on the “good will” of businesses to resolve the difficult issues of reducing resource use and emissions. It is necessary to create such a framework for business that it becomes profitable to reduce environmental costs. If we are to succeed in our efforts to avert a crash, improving the environment and sustainable use of resources has to be good and profitable business. For this purpose it is imperative to send the right signals to the market.

There are a number of success stories which illustrate that businesses are prepared to drive the economy in a more sustainable direction. The Toyota Prius is one. Demand for the Prius is driven by environmentally conscious consumers in the United States, where gasoline prices are low, and by economically conscious consumers in Europe, where gasoline prices are high. The Prius will hopefully be as much of a business success for Toyota as it successful in reducing emissions of greenhouse gases to the atmosphere.

The Economist, in a special issue on the environment (6 July 2002), concluded that the three powerful forces for sustainability are: the empowerment of local people, innovation to reduce ecological footprints and the greening of markets. I agree. The most important role of business is come forward with technical innovations that support sustainable development. But that is not enough. Businesses must also support efforts to empower consumers and assist government in greening markets.

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<sup>9</sup> Georg Soros, On Globalization, 2002.